

coagulation, but the blood in this case also remains dark, and scarcely reddens on exposure.

13. The blood of animals poisoned by urari has the same poisonous qualities as that substance itself, but not in a degree sufficient to produce the full effects of the poison. Urari when directly mixed with blood loses none of its efficacy.

14. Urari, in concentrated solution, applied locally to nerves extinguishes their excitability, but only after a considerable time, and it appears to act similarly on the nerves in the substance of the muscles. Dilute solutions have no injurious operation. Applied directly to the brain and spinal cord, urari is altogether harmless provided its absorption be prevented.

15. When artificial respiration is kept up in quadrupeds poisoned with urari, I find that, as observed by Bernard, many of the secretions become increased—as the tears, saliva, urine, and mucus of the air-passages, which effect appears to be owing to the paralysis of the vascular nerves and consequent dilatation of the vessels caused by the poison.

16. In mammalia urari causes death by paralysis of the respiratory nerves and suppression of the respiration, which brings on convulsions in these animals as a collateral effect. In frogs the final extinction of the functions may also be partly ascribed to suppressed action of the lungs and defective oxidation of the blood, which at length renders the heart unfit to perform its office; but it must be observed that in this case the cause of death is not so plain, inasmuch as in these animals the functions are in a great degree independent of the pulmonary respiration.

II. *Strychnia*.—Some experiments with strychnia (the acetate) gave the following results:—

1. Strychnia has not the least influence on the peripheral nerves through the blood, which is best shown by cutting the nerves before administering the poison.

2. Strychnia paralyzes the motor nerves of the voluntary muscles by exciting them to too energetic action, a paralysis which may be compared to that caused by powerful electric currents acting upon the nerves. In frogs, when the tetanic spasms are over, the nerves often show no trace of excitability; in mammalia they generally retain it in a slight degree, but never show the same energy of action as when uninjured.

3. Strychnia does not affect the sensory nerves.

4. The heart is not affected by strychnia, not even during the tetanic spasms, with the exception only that its pulsations are sometimes a little slower during the tetanic state. On the contrary, the lymph-hearts of frogs contract themselves as soon as the tetanus begins, and remain in this state as long as the spasms last.

5. The tetanic fits can be brought on in two ways: first, through the sensory nerves, which, by irritating the gray substance of the spinal cord, produce the tetanic contractions as reflex movements; and, secondly, through the brain, which is not affected at all by strychnia and preserves its powers of volition and sensation. Accordingly, animals poisoned with strychnia try to move in the ordinary way, but every attempt brings on a tetanic fit, so that it is plain that the spinal cord may also be excited by the brain to its peculiar actions.

6. If the tetanus produced by strychnia has been strong, the muscles are less irritable and pass much sooner into the state of cadaveric rigidity, which is very strongly marked, and seems to last longer than it generally does. The same early onset of rigidity may be observed in animals killed by tetanus excited by electricity.—*Med. Times and Gaz.*, Sept. 13, 1856.

52. *On Oils as Promoting the Poisonous Action of Cantharides*.—The solubility of cantharidin in oils has led Orfila, Taylor, Christison, Mitscherlich, Oesterlen, and other toxicologists to promulgate cautions against the use of fatty matters in poisoning with Spanish flies. On the other hand, Clarus, in his *Handbuch der Speciellen Arzneimittellehre*, considers that there are no grounds for this caution. Professor Schroff, of Vienna, who has performed a number of experiments on the action of Spanish flies and cantharides, has published

the results of the administration of these substances in combination with oil. Three rabbits—two of four and six months old respectively, and one full-grown—had the poison given to them. To the first was administered $15\frac{1}{2}$ grains of powdered cantharides, rubbed up with olive oil; to the second, $7\frac{1}{2}$ grains, prepared in the same way; and to the third was given $1\frac{1}{2}$ grains of cantharidin, similarly prepared; to each were also administered several table-spoonfuls of olive oil. The results compared with cases in which the poison was given without oil, were the following:—

1. The symptoms during life were identified in both classes of cases.

2. Death occurred soonest in the cases in which oil was given. Fifteen grains of cantharides with oil caused death in four hours; without oil, in five hours. Seven and a half grains with oil destroyed life in nineteen hours; without oil, in twenty-six hours. One and a half grains of cantharidin, with oil, killed the animal in four hours; without oil, in from seven to ten hours.

3. The *post-mortem* appearances give evidence of less action of the poison on the parts with which it comes in contact, where oil is given, than when the poison is taken alone. In the three rabbits poisoned as above related, there was no vesication of the tongue; and the inflammation of the stomach and intestines was less than in cases of the other class. On the other hand, the signs of inflammation of the urinary system were more strongly marked where oil was given. The bladders were contracted and empty; the kidneys were much injected; and the urinary mucous membrane presented on its surface a larger quantity of epithelium, nuclei, and blood-corpuscles.—*Assoc. Med. Journal*, Sept. 20, 1856, from *Wochenblatt der Zeitschrift der k. k. Gesellschaft der Aerzte zu Wien*, Nos. 48 and 49, 1855.

53. *Poisonous Effects of Vapour of Sulphuret of Carbon in Caoutchouc Manufactories*.—In describing the poisonous effects produced by the vapour of sulphuret of carbon on workmen in India-rubber manufactories, Dr. DELPECH gives the following case as typical:—

CASE.—Victor Delacroix, aged 27, of good general health, in 1853 commenced to work in an India-rubber manufactory. His duty was to dissolve the gum in sulphuret of carbon; and in the room where he was employed, there was constantly a large quantity of the vapour of this substance. During three months he suffered from violent headache; at the end of this time, he was seized with general *malaise* and intense vertigo, and his sight became so weak that he was obliged to leave off work in a few hours. His hearing also became affected, and in a week he was so deaf that persons were obliged to shout into his ear to make him hear; this deafness disappeared spontaneously after some time. His memory became so weak that he forgot every minute where were the tools which he had just used. His temper also became very changeable: sometimes he was excessively lively, and at others he was angered by the most trifling circumstances, and would break everything near him. He slept with difficulty—frequently not at all; and awoke suddenly under the influence of painful dreams or convulsive starts, accompanied by rigors, heat, and profuse perspirations. Even during the day, he was seized with an icy coldness for several hours, which left him in a state of great lassitude. He had severe attacks of colic, frequent indigestion, nausea, vomiting of greenish matters several times in the day, and transient diarrhoea of fetid matters alternating with constipation. There was constant loss of appetite; the mouth was pasty and expectoration frequent. He became so weak that he was obliged to sit at his work, to use a stick in walking, and to rest at each step in going up stairs. This debility, which affected both the upper and the lower limbs, was accompanied by a kind of cramp or transient convulsions in the muscles of the hands, which for a short time deprived him of the use of his fingers. The sexual appetite was altogether lost. His wife, when she was in the habit of remaining some time with him in his work-room, was also seized with headache and muscular debility. She fell into a state analogous to that of her husband, but much less severe. The young child of Delacroix, on being brought from the country and passing three days in the workshop, was seized with a kind of furious delirium, and attempted to bite its parents. In March, 1854, Delacroix entered